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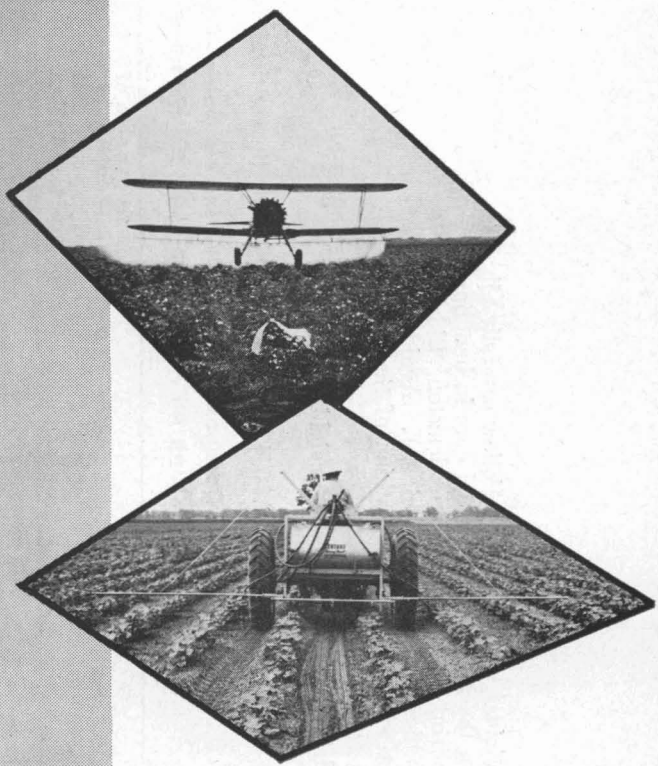
Guide for Controlling

COTTON INSECTS

in the High Plains and Trans-Pecos Areas of Texas



TEXAS A&M UNIVERSITY
TEXAS AGRICULTURAL EXTENSION SERVICE
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Guide for

Controlling Cotton Insects

in the

High Plains and Trans-Pecos Areas

of Texas

THIS GUIDE IS A SUPPLEMENT to the State-wide guide, L-218, *Texas Guide for Controlling Cotton Insects*, and primarily is for use in the Texas High Plains and Trans-Pecos areas. Growing conditions for cotton and cultural practices in these areas are distinctly different from many other parts of the State. The boll weevil is not common and climatic conditions, rainfall and soil type differ considerably.

Cotton insects can be controlled economically by using proper insecticides at the correct time (refer to recommendations). Poisons must cover the plants to kill insects. Timely, effective applications of insecticides to control damaging insect infestations should result in substantial profits to the cotton producer, although numerous applications may be required. Cotton grown under dryland conditions generally has lighter insect infestations and injurious infestations usually do not last as long as on irrigated cotton. Consequently, few insecticide applications are needed.

INSECT CONTROL PROGRAM

The cotton insect control program for the areas includes three major phases with the following objectives:

1. Early-season control (insures early fruiting and maturity in certain areas)
2. Late-season control (insures continued fruiting and protects fruit)
3. Early-stalk destruction and farm cleanup (reduces overwintering populations of boll weevils and pink bollworms)

The grower must carry out an adequate control program for greatest benefits. Examine cotton fields closely throughout the growing season to determine when to apply insecticides.

EARLY-SEASON CONTROL PROGRAM

Base early-season control on infestation counts for substantial savings. The early-season control program in most years will be conducted primarily to control thrips and fleahoppers. Regular and thorough insect checks by the grower are necessary for good insect control. If the cotton producer knows the insect situation in his field, he can determine when to apply insecticides. Every grower should know how to make insect counts, when to apply insecticides based on insect popu-

lation numbers and how to recognize damage by different cotton insects.

The grower who follows an early-season control program, based on infestation numbers, uses insecticides only when needed.

Application of insecticides during the early-fruiting period may create conditions favorable for a bollworm buildup. Employ, when needed, a well-executed, early-season program to control early-season pests, such as thrips, overwintered boll weevils and fleahoppers.

EARLY-SEASON PESTS

Thrips

Heavy infestations of thrips on young cotton may delay plant maturity a few days to a few weeks. Thrips normally cause heaviest damage from plant emergence until early squaring. Serious damage may continue for longer periods. The first sign of thrips damage on newly-emerged cotton is wilted, wrinkled, blackened leaves and terminal growth. Number of thrips and time of occurrence varies from season to season.

Fleahoppers

Fleahoppers usually begin damaging cotton when fruiting starts and continue to cause damage throughout the season. Base control measures on infestation counts and the apparent loss of small, terminal forms as cotton fruiting progresses. Protect the first forms to allow the cotton to produce early fruit.

Fleahoppers damage only the small squares and do not cause the shedding of larger squares or bolls. After plants have set more fruit than the cotton is capable of maturing under a given set of growing conditions, do not continue fleahopper control. Additional forms ordinarily will be shed by the cotton plant.

Check all cotton carefully to determine the degree of infestation before applying insecticides. The presence of aphids, spider mites or other insect pests may influence insecticide selection. (For additional information on cotton insects, see Extension publication B-933, *Cotton Insects.*)

LATE-SEASON CONTROL PROGRAM

The late-season control program, like the early-season control program, is based on infestation counts. The principal insect involved is the bollworm. Other cotton insects which may occur are fleahoppers, lygus bugs, cotton leafworms, cabbage loopers, aphids, spider mites, garden webworms, beet armyworms, tobacco budworms and stink bugs. Begin control measures when bollworms, tobacco budworms and cabbage loopers are small.

Bollworms

The bollworm is a common pest of cotton and many other crops. A history of this area shows that the boll-

worm causes more damage to cotton than any other insect.

Eggs generally are laid on the tender growth of the terminal areas of the plant. The eggs hatch in about 3 days and the small worms begin working their way down the cotton plants, feeding on the squares and bolls.

Tobacco Budworms and Beet Armyworms

Damaging numbers of tobacco budworms or beet armyworms may occur along with the bollworm population. These species attack cotton in a manner similar to that of the bollworm.

Apply insecticides when the worms are small.

Boll Weevils

The appearance of the boll weevil in the El Paso Valley and the eastern High Plains presents a serious threat to cotton production in these areas. See remarks in table for discussion of infestation counts and control recommendations. Refer to Extension publication B-933, *Cotton Insects,* for a discussion of life history and damage.

Pink Bollworms

See Extension publication L-219, *Ways to Fight the Pink Bollworm in Texas.*

EARLY STALK DESTRUCTION AND FARM CLEANUP

Early harvest, immediate stalk destruction and plowing under debris reduces boll weevil and pink bollworm populations. These practices force the boll weevil into starvation before time to enter winter quarters, prevent late-season buildup of weevils and pink bollworms and reduce the numbers that survive the winter. See L-219, *Ways to Fight the Pink Bollworm in Texas.*

BENEFICIAL INSECTS

Natural populations of beneficial insects may help control cotton pests such as the bollworm, cotton aphid and spider mite. Never rely entirely on beneficial insects to control cotton insects, but examine fields frequently to determine the need for insecticides.

The introduction or release of either trichogramma wasps or convergent lady beetles has not proved effective in controlling damaging bollworm populations.

GENERAL INFORMATION

In the late-season program, dusts and sprays are equally effective when properly applied. Repeat the application as soon as possible if the poison is washed off within 24 hours, except when aphicides are used.

When infestations are heavy, increase dosages to the maximum and apply at 5-day intervals or less.

For detailed information on the use of sprays and spray machinery, see Extension publication L-486, *In-*

secticidal Spraying of Field Crops with Ground Machinery.

Apply dusts when the air is relatively calm. Dew on plants is not necessary. Dusts and wettable powders are washed off more easily by light showers than sprays. Place dust nozzles on ground machines 4 to 6 inches above the plants.

Ground machines and airplanes are equally effective for applying poisons. For best results with airplanes, flag the swaths so that they overlap. Increase dosages recommended in this guide by at least 50 percent when an airplane is used in making early-season applications. Apply aerial spray at 3 or 4 gallons per acre.

Some poisons are particularly destructive to honeybees. Make a determined effort to prevent their destruction, since bees help pollinate many agricultural crops.

The recommendations in this Guide are based upon results of experiments conducted by the Texas Agricultural Experiment Station of Texas A&M University and the Entomology Research Division, United States Department of Agriculture.

For additional information, contact your county agent or write the Extension Entomologists, College Station, Texas.

CONVERSION TABLE

Pounds of Actual Insecticide in Different Quantities of Spray Concentrate

Insecticide	Gallon	2 Quart	1 Quart	1 Pint
Aldrin	2.0	1.0	0.5	0.25
Bidrin	8.0	4.0	2.0	1.0
DDT	2.0	1.0	0.5	0.25
DDT	3.0	1.5	0.75	0.375
Demeton	2.0	1.0	0.5	0.25
Dieldrin	1.5	0.75	0.375	0.187
Endrin	1.6	0.8	0.4	0.2
Ethion	4.0	2.0	1.0	0.5
Guthion	2.0	1.0	0.5	0.25
Heptachlor	2.0	1.0	0.5	0.25
Malathion	5.0	2.5	1.25	0.675
Methyl parathion	2.0	1.0	0.5	0.25
Methyl parathion	4.0	2.0	1.0	0.5
Methyl Trithion	4.0	2.0	1.0	0.5
Parathion	2.0	1.0	0.5	0.25
TDE	2.0	1.0	0.5	0.25
Toxaphene	6.0	3.0	1.5	0.75
Trithion	4.0	2.0	1.0	0.5
BHC-DDT	2.4	1.2	0.6	0.3
Strobane-DDT	6.0	3.0	1.5	0.75
Toxaphene-DDT	6.0	3.0	1.5	0.75
		Pounds Actual Sevin		
	3.0	2.0	1.0	0.5
Pounds of Sevin 80% wettable powder required	3.75	2.5	1.25	0.625

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CAUTION

All insecticides are poisonous. Follow carefully all precautions on the label. Take special care in handling parathion, endrin, methyl parathion, demeton, Bidrin, Di-Syston, Guthion and phorate (Thimet). Avoid prolonged contact with the skin or breathing of the vapors or drift from either sprays or dusts.

Insecticidal drift may contaminate neighboring vegetables or forage crops at the time cotton is sprayed or dusted.

THREE-WAY INSECTICIDAL MIXTURES

Commercial mixtures of emulsifiable concentrates containing three insecticides are being marketed in the State. Know the contents of such mixtures and apply recommended dosages of the required insecticides to give control of the pests involved.

EARLY-SEASON CONTROL PROGRAM (Insecticides listed at random)

Increase Dosages Recommended in This Guide at Least 50 Percent When Using an Airplane to Make Early-season Applications

Insects	Insecticides	Pounds per acre of actual insecticide to be applied as spray unless otherwise indicated	Remarks
Application at planting time for control of:			
Thrips Aphids Spider mites Leaf miners	A. Di-Syston (Granules-in-furrow) B. Phorate (Granules-in-furrow) C. Phorate (Pre-treated seed)	0.5-1.0 0.5-1.0 1.0-1.5 lbs. per 100 lbs. seed	These insecticides provide control for 4 to 6 weeks following planting. When used at the maximum recommended rates under conditions of cool, wet weather, phorate or Di-Syston may cause some delay in emergence or stunting and result in stand reduction. Injury may be more pronounced on light sandy soils. Exercise care in using systemic insecticides in conjunction with pre-emergence herbicides.
Cutworms and certain armyworms	A. Strobane-DDT[2] B. Toxaphene-DDT (2-1 mixture)[2] C. Endrin[2,9]	2.0-3.0 2.0-3.0 0.3-0.4	Examine seedling cotton for presence of these pests. Apply treatment as needed.
Darkling beetles	A. Heptachlor[2,4] B. Dieldrin[2]	0.5 0.375	Brown to black beetles which feed around base of seedlings. Damage resembles cutworm attack. Begin control when damage warrants it.
Garden webworms	Use insecticides recommended for bollworm control.		
Thrips and fleahoppers	A. Dieldrin + DDT[2] B. Guthion[3] C. Strobane-DDT (2-1 mixture)[2] D. Sevin[5] E. Toxaphene-DDT (2-1 mixture)[2] F. Heptachlor + DDT[2,4] G. Endrin + DDT[2,9] H. Bidrin[2,8]	0.2-0.25 + 0.5 0.125-0.25 1.25-2.25 0.5-1.0 1.25-2.25 0.25-0.375 + 0.5 0.2-0.3 + 0.5 0.1-0.25	THRIPS—Begin control measures as soon as damage is apparent on seedling plants. Damage is characterized by wilted, deformed and blackened leaves. Silvering of the lower leaf surface also is common. Apply sprays at 7-day intervals if infestation persists. If difficulty is encountered in controlling thrips, substitute methyl parathion[6,10] at 0.25 lb. per acre for DDT. FLEAHOPPERS—After cotton is old enough to produce squares, examine the main stem terminal buds (about 3-4 in. of top of plant) of 100 cotton plants at several representative points in the field. As cotton reaches the fruiting stage, apply control measures when 15-20 fleahoppers are found per 100 terminals. As plants increase in size and fruit load, larger populations may be tolerated without serious damage. Base later treatments on numbers of fleahoppers and on damage as indicated by excessive loss of small squares. Apply sprays at 7-day intervals.
Cotton aphids	A. Malathion B. Methyl parathion[6] C. Parathion[6] D. Demeton[2,7]	0.625-0.9 0.25-0.375 0.25-0.375 0.125-0.25	In early-season, apply insecticides as needed. In late-season, begin treatment when honeydew appears. Demeton, parathion, malathion or methyl parathion may be combined with other sprays.
Overwintered boll weevils	A. Sevin[5] B. Guthion[3] C. Methyl parathion[6,10] D. Methyl Trithion[2,4] E. Toxaphene-DDT (2-1 mixture)[2] F. Strobane-DDT (2-1 mixture)[2] G. Endrin + DDT[2,9]	1.25-1.5 0.25 0.25-0.375 0.25-0.375 2.0-3.0 2.0-3.0 0.3-0.4 + 0.5-1.0	Where weevils are found apply just before first squares are one-third grown to prevent egg laying. If emergence of more weevils from hibernation sites occur, an additional treatment may be necessary. These insecticides also control thrips and cotton fleahoppers. Guthion, Sevin, Methyl Trithion and methyl parathion produce rapid, effective control of overwintered boll weevils in areas where they are resistant to chlorinated hydrocarbons.

Extending the early-season control program beyond the one-third grown square stage may create conditions favorable for a bollworm build-up. However, if fleahoppers are present in injurious numbers it may be necessary to initiate the late-season control program.

LATE-SEASON CONTROL PROGRAM (Insecticides listed at random)

Insects	Insecticides	Pounds per acre of actual insecticide to be applied as spray or dust	Remarks
Apply dusts at 10-15 lb. per acre unless otherwise indicated.			
Bollworms	A. Strobane-DDT (2-1 mixture)[2] B. Endrin + DDT[2,9] C. Toxaphene-DDT (2-1 mixture)[2] D. Sevin[5]	3.0-4.5 0.3-0.5 + 1.0-1.5 3.0-4.5 2.0-3.0	HOW TO CHECK FOR BOLLWORMS—Examine the terminal buds (upper 3-4 in. of plant) of 100 cotton plants and 100 consecutive squares and bolls at each of several points in the field. Begin treatment when bollworm eggs and 4 or 5 young worms are found per 100 terminals or 5% of the small squares and bolls have been injured by small bollworms. *Make additional*

Where tobacco budworms, beet armyworms, and/or

	C. Parathion[6]	0.25-0.375	Demeton, parathion, malathion or methyl parathion may be combined with other sprays.
	D. Demeton[2,7]	0.125-0.25	
Overwintered boll weevils	A. Sevin[5]	1.25-1.5	Where weevils are found apply just before first squares are one-third grown to prevent egg laying. If emergence of more weevils from hibernation sites occur, an additional treatment may be necessary. These insecticides also control thrips and cotton fleahoppers. Guthion, Sevin, Methyl Trithion and methyl parathion produce rapid, effective control of overwintered boll weevils in areas where they are resistant to chlorinated hydrocarbons.
	B. Guthion[3]	0.25	
	C. Methyl parathion[6,10]	0.25-0.375	
	D. Methyl Trithion[2,4]	0.25-0.375	
	E. Toxaphene-DDT (2-1 mixture)[2]	2.0-3.0	
	F. Strobane-DDT (2-1 mixture)[2]	2.0-3.0	
	G. Endrin + DDT[2,9]	0.3-0.4 + 0.5-1.0	

Extending the early-season control program beyond the one-third grown square stage may create conditions favorable for a bollworm build-up. However, if fleahoppers are present in injurious numbers it may be necessary to initiate the late-season control program.

LATE-SEASON CONTROL PROGRAM (Insecticides listed at random)

Insects	Insecticides	Pounds per acre of actual insecticide to be applied as spray or dust	Remarks
Apply dusts at 10-15 lb. per acre unless otherwise indicated.			
Bollworms	A. Strobane-DDT (2-1 mixture)[2]	3.0-4.5	HOW TO CHECK FOR BOLLWORMS—Examine the terminal buds (upper 3-4 in. of plant) of 100 cotton plants and 100 consecutive squares and bolls at each of several points in the field. Begin treatment when bollworm eggs and 4 or 5 young worms are found per 100 terminals or 5% of the small squares and bolls have been injured by small bollworms. Make additional applications as needed. DDT resistant bollworms and tobacco budworms occur in several areas of the State. DDT alone may be used to control these pests where resistance does not occur. Check fields closely 2 to 3 days following each application to be sure of effective control. Where control has not been obtained repeat the application immediately using one of the recommended materials plus methyl parathion.
	B. Endrin + DDT[2,9]	0.3-0.5 + 1.0-1.5	
	C. Toxaphene-DDT (2-1 mixture)[2]	3.0-4.5	
	D. Sevin[5]	2.0-3.0	
	Where tobacco budworms, beet armyworms, and/or resistant bollworms are encountered, add 0.5 to 1.0 pound of methyl parathion[6,10] to one of the above listed recommendations.		
	TDE[2] may be substituted for DDT in any of the above mixtures.		
Boll weevils	A. Sevin[5]	1.6-2.4	HOW TO CHECK FOR BOLL WEEVILS—Examine cotton weekly. Pull 100 squares, at least ⅓ grown, at random, taking a few squares at several representative places in the field. If 15 to 25% or more have weevil punctures, begin treatment. Apply insecticides at 5-day intervals. Under extremely heavy buildups it may be necessary to shorten the interval to 3 days.
	B. Strobane-DDT (2-1 mixture)[2]	3.0-4.5	
	C. Methyl Trithion[2,4]	0.5	
	D. Methyl parathion[6,10]	0.375-0.5	
	E. Endrin + DDT[2,9]	0.3-0.4 + 0.5-1.0	
	F. Toxaphene-DDT (2-1 mixture)[2]	3.0-4.5	
	G. Guthion[3]	0.25	
	H. Calcium arsenate[2] (dust only)	10-15	
	Under conditions of heavy boll weevil infestations where it is desirable to reduce weevil numbers quickly, use Guthion or add Methyl Trithion or methyl parathion to toxaphene-DDT, Strobane-DDT or endrin-DDT.		
Cotton aphids	Use insecticides as recommended for early-season control.		
Fleahoppers	Use insecticides as recommended for early-season control.		
Spider mites	A. Trithion[2]	0.375-0.75	Treat when leaves begin to turn yellow. Demeton, ethion or Trithion generally are more effective for controlling the two spotted mite. Two applications at 5-day intervals may be necessary with all materials except demeton.
	B. Methyl parathion[6,10]	0.25-0.375	
	C. Ethion[2,4]	0.375-0.75	
	D. Parathion[6]	0.25	
	E. Demeton (Systox)[2,7]	0.25	
Lygus and stink bugs	A. Strobane-DDT (2-1 mixture)[2]	1.5-3.0	When 1 to 2 bugs per 100 sweeps with a 15 to 16-inch net are found, begin treatment. Apply dusts or sprays at 5 to 7-day intervals or as required.
	B. Toxaphene-DDT (2-1 mixture)[2]	1.5-3.0	
	C. BHC-DDT (3-5 mixture)[2,11]	1.25	
	D. DDT[2]	1.0	
Leafworms	A. Guthion[3]	0.25	Apply dusts or sprays when cotton leafworms first appear. Young worms are easier to kill than old worms.
	B. Parathion[6]	0.125-0.25	
	C. Sevin[5]	1.0-1.25	
	D. Methyl parathion[6,10]	0.125-0.25	
	E. Toxaphene-DDT (2-1 mixture)[2]	1.5-3.0	
	F. Strobane-DDT (2-1 mixture)[2]	1.5-3.0	
Cabbage loopers	A. Endrin[2,9]	0.4-0.5	Begin treatment when small worms first appear.
Grasshoppers	A. Dieldrin[2]	0.2	Apply insecticide when damaging infestations appear. Use baits for control of "jumbo" grasshoppers. (See your county agent for bait mixtures.)
	B. Aldrin[2]	0.25-0.375	
	C. Heptachlor[2,4]	0.25-3.75	
	D. Toxaphene[2]	1.5-3.0	
	E. Sevin[5]	1.5-2.0	
Pink bollworms	A. Sevin[5]	1.5-2.0	Apply DUSTS at 15 lb. per acre at 5-day intervals. Apply SPRAYS at 5-day intervals.
	B. DDT[2]	1.5-2.0	
	C. Guthion + DDT[2,3]	0.187-0.375 + 1.5-1.0	

[1]Dusts are effective, but sprays are considered more practical under early-season conditions.

[2]Do not graze or feed treated plants, including gin waste, to dairy animals or animals being finished for slaughter.

[3]Do not apply within 1 day of harvest. Do not pasture fields or feed gin waste if late applications are made.

[4]Do not apply after bolls open.

[5]Problems may be encountered in spraying wettable powder with low-volume farm sprayers; follow manufacturer's directions carefully.

[6]Do not apply within 5 days of hand picking.

[7]Do not apply within 21 days of harvest.

[8]Do not apply within 10 days of harvest.

[9]Protect workers entering fields within 5 days of application.

[10]Workers entering fields within 24 hours after application should wear protective clothing.

[11]Do not apply when rotating with root crops.